

## Calculus Warm Up #1-1

Find an explicit rule for each sequence:

1)  $2, -1, \frac{1}{2}, -\frac{1}{4}, \frac{1}{8}, \dots$

2)  $\frac{1}{2 \cdot 3}, \frac{1}{3 \cdot 4}, \frac{1}{4 \cdot 5}, \frac{1}{5 \cdot 6}, \dots$

3)  $1, -1, -1, 1, 1, -1, -1, \dots$

HW Questions: p. 570

In Exercises 1–8, write out the first five terms of the sequence with the given  $n$ th term.

1.  $a_n = 2^n$

3.  $a_n = \left(-\frac{1}{2}\right)^n$

5.  $a_n = \frac{3^n}{n!}$

7.  $a_n = \frac{(-1)^{n(n+1)/2}}{n^2}$

Find the rule:

9.  $1, 4, 7, 10, \dots$

11.  $-1, 2, 7, 14, 23, \dots$

13.  $\frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \dots$

In Exercises 25–46, determine the convergence or divergence of the sequence with the given  $n$ th term. If the sequence converges, find its limit.

25.  $a_n = \frac{n+1}{n}$

27.  $a_n = (-1)^n \left( \frac{n}{n+1} \right)$

29.  $a_n = \frac{3n^2 - n + 4}{2n^2 + 1}$

$$31. a_n = \frac{n^2 - 1}{n + 1}$$

$$33. a_n = \frac{1 + (-1)^n}{n}$$

$$35. a_n = \cos \frac{n\pi}{2}$$

$$37. a_n = \frac{3^n}{4^n}$$

$$39. a_n = f^{(n-1)}(2), f(x) = \ln x$$

$n$	1	2	3	4	5
$f^{(n-1)}(2)$	$\ln 2$	$\frac{1}{2}$	$-\frac{1}{4}$	$\frac{2}{8}$	$-\frac{6}{16}$

$$a_n = \frac{(-1)^{n-2} (n-2)!}{2^{n-1}}, n > 1$$

41.  $a_n = 3 - \frac{1}{2^n}$

43.  $a_n = \left(1 + \frac{k}{n}\right)^n$

45.  $a_n = \frac{n^p}{e^n} (p > 0)$

Class Activity:

Practice Test - Multiple Choice,

No Calculator.

55 minutes.

Check answers posted after this slide.

Practice Test Answers:

- |      |       |       |
|------|-------|-------|
| 1. C | 10. D | 19. A |
| 2. D | 11. B | 20. C |
| 3. C | 12. D | 21. C |
| 4. B | 13. B | 22. A |
| 5. C | 14. D | 23. B |
| 6. B | 15. E | 24. D |
| 7. A | 16. E | 25. A |
| 8. D | 17. D | 26. C |
| 9. C | 18. D | 27. E |
|      |       | 28. E |

HW: Look up the topic for each problem you missed on the practice test.

Find a similar problem in the book and do it.

Finish the practice test if you didn't make it to the end.